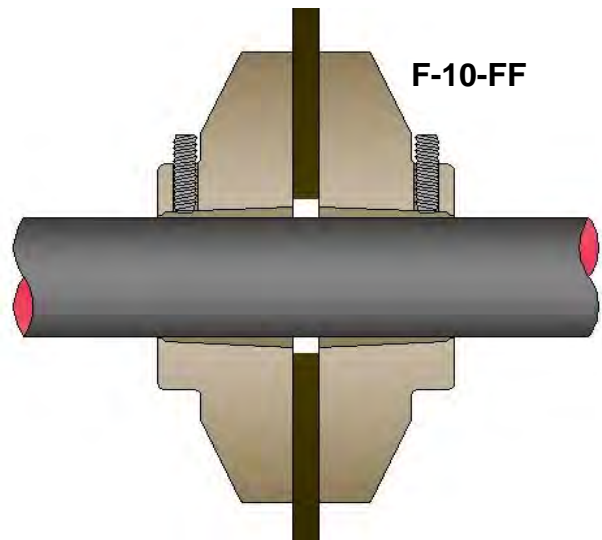
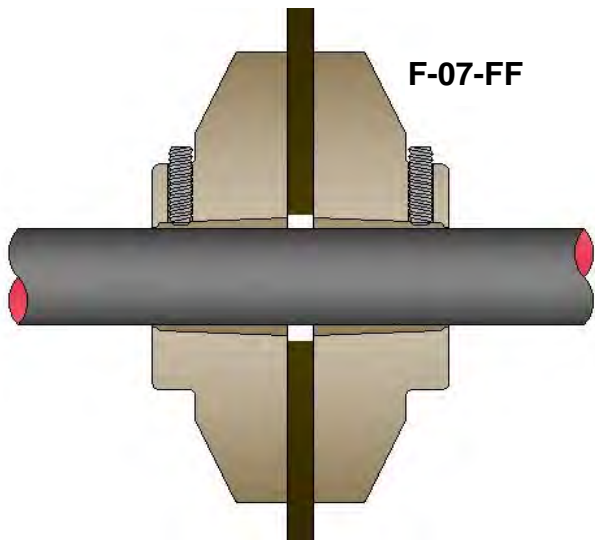


BRAVO FF-SERIES INSTALLATION INSTRUCTIONS

**BRAVO FRP FLANGE FITTINGS FOR SINGLE WALL FRP SUMPS ONLY
GALVANIZED & ROBROY PVC-COATED CONDUIT ONLY**



For Fittings, visit www.sbravo.com/fs

NOTE: Products may vary in appearance from illustrations in this manual.

For illustration purposes, an additional set-screw at 90° clockwise from the 12-o-clock position is not shown. See page 7 for accurate illustration.

PRODUCT SPECS:

PART #	Length	O.D.	Allowed Angle	Pipe type and size
F-07-FF:	1-1/4"	5"	0-5°	3/4" Conduit
F-10-FF:	1-1/4"	5"	0-5°	1" Conduit
F-07-FFRR:	1-3/8"	5"	0-5°	3/4" RobRoy PVC-Coated
F-10-FFRR:	1-3/8"	5"	0-5°	1" RobRoy PVC-Coated
F-07-FF-RND*:	1-5/16"	5"	0-5°	3/4" Conduit
F-10-FF-RND*:	1-5/16"	5"	0-5°	1" Conduit
F-07-FFRR-RND*:	1-5/16"	5"	0-5°	3/4" RobRoy PVC-Coated
F-10-FFRR-RND*:	1-5/16"	5"	0-5°	1" RobRoy PVC-Coated



* **FOR ROUND SUMPS:** One Bravo Clamp per fitting. See page 7.

READ THIS MANUAL FRONT TO BACK

MANDATORY

The FF-Series All-Fiberglass Flange Fittings from S. Bravo Systems, Inc. **MUST** be installed by a **Bravo Certified Installer**. Get Certified at www.sbravo.com/cert

IMPORTANT

READ THESE INSTRUCTIONS - KEEP FOR FUTURE REFERENCE

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- Closely adhere to all directions and warnings indicated on the product or contained in these instructions.

- Warranty is void if there is any evidence of modification, abuse, negligence or improper installation.

**If you have any problems with Bravo Systems components or accessories,
 Contact Bravo Systems Immediately:**

1-800-28-BRAVO 1-323-888-4133 info@sbravo.com

SAFETY FIRST! S. Bravo Systems, Inc. urges you to adhere to the normal safety procedures and precautions followed by your company. Please follow the mandates and compliances decreed by OSHA, local, State and federal regulations regarding the use of this product.

WARRANTY

All containment systems sold by S. Bravo Systems, Inc. are warranted to be free from defects in material and workmanship for a period of one year from date of purchase. This warranty will be limited to the repair and replacement of Bravo parts only and will exclude all claims for labor or consequential damage. No other express warranties given and no affirmation of S. Bravo Systems, Inc., or its agents and/or representatives, by words or action, will constitute a warranty. **IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.**

This warranty is void if there is any evidence of modification, abuse, negligence, or improper installation. If any fittings or components, other than S. Bravo Systems approved fittings or components, are used in conjunction with any S. Bravo Systems product, the warranty pertaining to these products is immediately void.

Included Parts (Per fitting)

- A) 2x Fiberglass FF-Series Flanges with dual integrated set-screws* (at 12 and 3-o-clock)
*F-07-FF, F-10-FF, F-07-FFRR, F-10-FFRR / RND.....1/4" Metal Set Screw
- B) 2x two-ounce bag of Fiberglass Filler for Adhesive
- C) 2x Pair of Industrial Nitrile gloves (Large)
- D) 1x 60 grit emery cloth sanding strip
- E) 1x Allen Hex wrench

REQUIRED TOOLS (NOT PROVIDED)

Acetone or equivalent. Hole saw: 2" diameter. Air Drill and/or sander.

RECOMMENDED ADHESIVES: Bravo ADHESIVE-EPOXY-KIT

Approved Adhesives: Smith or Ameron epoxy

FOR ROUND SUMPS: One Bravo Clamp "T-FF-CLAMP-1" per fitting.

NEED CLAMPS?

See PAGE 7 for part numbers

Number of fittings that can be installed per Adhesive Kit			
	Ameron 5 oz	Ameron 8 oz	Smith 6.5 oz
F-07-FF / RND	3	4	3
F-10-FF / RND	3	4	3
F-07-FFRR / RND	3	4	3
F-10-FFRR / RND	3	4	3



WARNING



WARRANTY IS VOID:

IF ANY OF THE FOLLOWING OCCUR

- A)** Adhesive that is not Bravo-Approved is used to install the FF-Series Flange fittings.
- B)** F-1X-FFRR models that require RobRoy PVC-Coated Conduit are installed with any other brand of PVC-Coated Conduit other than RobRoy.
- C)** FF-Series Fiberglass Fittings are **NOT** installed per the directions in this manual.
- D)** FF-Series Fiberglass Fittings are **NOT** installed by a Bravo-Certified Installer.
- E)** The F-Series Fittings are applied to Fiberglass Sumps that are not **Third Party Approved**.

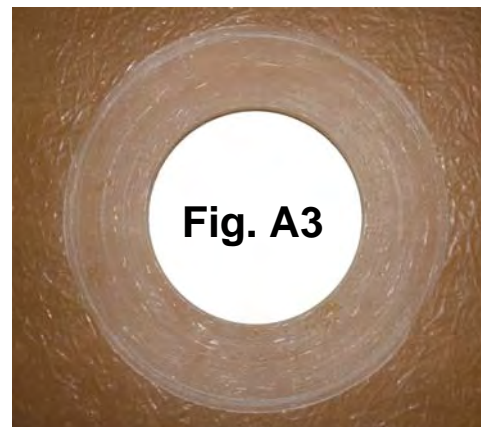
A) Preparing the Fitting & FRP wall

A.1) FITTINGS: Prepare your fittings by identifying the parts. Do not lay them on dirt, water, debris or other contaminated surfaces. When dusting off, use a shop brush or compressed air. Bravo FF-Series fittings ship with all contact surfaces (surfaces that contact the sump wall and pipe) factory abraded. As a precaution, Hand-sand the contact surfaces of all fittings, dust off and clean with acetone to remove any contamination. **Do not use rags, paper towels or any kind of cloth or fabric material.**

▲ CRITICAL DO NOT PLAN/MAKE HOLE SAW CUTS ON OR WITHIN 1" INCH OF CORNERS, EDGES, REPAIRS OR LAMINATED JOINTS.

A.2) SUMP WALL: DOUBLE-CHECK YOUR GRADE AND PIPE FALL MEASUREMENTS. Dust off Sump walls (inside and out) and **drill your pilot holes** centered on the planned fitting locations using a 1/4" Drill bit. Proceed when done to cut your holes with appropriate size hole saw with 1/4" centralizer. **See the hole saw size chart below.**

<u>HOLE SAW SIZE CHART</u>	<u>SAND KIT</u>
2" for F-07-FF Fittings	T-FS-SAND-F1
2" for F-10-FF Fittings	T-FS-SAND-F1



A.3) FLAT WALLS ONLY: OPTIONAL:

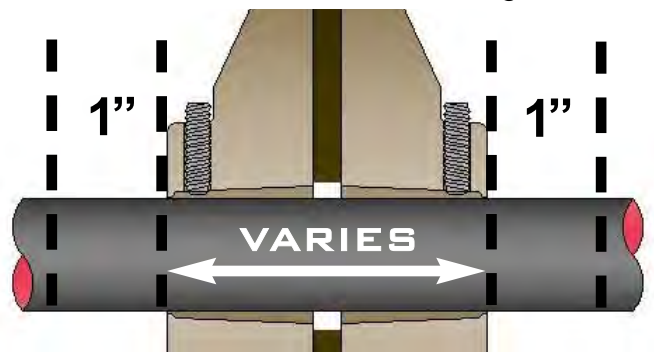
Use bravo Sand Kits of appropriate model to sand your wall absolutely flat and even, inside and outside. This tool is highly recommended to ensure the absolute best surface finish in preparation for bonding. Review the Sand Kit manual that came with your Sand Kit or call Bravo to obtain a copy.

MANDATORY: If you do not use a Bravo Sand Kit **YOU MUST** sand the sump wall 2" out from each cut hole inside and outside until the surfaces are flat and even, and any paint, gel-coat or contaminants are removed and clean, open fiberglass is visible (**Fig. A3**).

DO NOT OVERSAND!! MAINTAIN A MINIMUM WALL THICKNESS OF 1/8" INCH

A.4) You must rough up (hand sand) the area of the conduit that contacts the fittings **One Inch (1")** away from the face of the flange, when dry fit, and all of the conduit between the two Flanges, 360°.

DO NOT USE POWER TOOLS ON CONDUIT! NEVER DRILL, TAP OR CUT ON THIS FITTING



CAUTION

WINTER WARNING

**FOR COLD WEATHER AT 50°F DEGREES OR LESS:
OBSERVE AND FOLLOW THE WARNINGS BELOW**

BRAVO SYSTEMS FF-SERIES FLANGE FITTINGS AND F-SERIES FITTINGS ARE THICKER THAN THE TYPICAL FIBERGLASS CLAMSHELLS COMMONLY INSTALLED IN FIBERGLASS PIPING APPLICATIONS.

YOU MUST APPLY ADEQUATE HEAT TO THE PARTS AND BONDING ADHESIVES TO ALLOW A FULL CURE TIME DURING EXTREME COLD TEMPERATURES. FAILING TO ALLOW THE INSTALLATION TO FULLY CURE MAY CAUSE THE ADHESIVE BOND TO THE FITTING TO FAIL.

▲ CRITICAL JUST BEFORE EACH ADHESIVE APPLICATION
DRY FIT YOUR COMPONENTS ONE LAST TIME

- 1) PRE-HEAT THE SUMP TO NO MORE THAN 150°F TO ELIMINATE MOISTURE.
- 2) PRE-HEATING COMPONENTS IN EXTREME COLD WEATHER IS CRITICAL:
 - > PRE-HEAT THE FIBERGLASS FITTING THOROUGHLY TO ~100°F
 - > PRE-HEAT THE ADHESIVE TO ~80°F. DO NOT HEAT CATALYST!!
- 3) DO NOT ASSUME THE ADHESIVE IS CURED BECAUSE IT HAS HARDENED ON THE EXTERIOR. IT MAY ONLY BE A CURED “CRUST” IN THIS TEMPERATURE AND ANY MOVEMENT OR WATER TESTING MAY CAUSE DELAMINATION AND TOTAL FAILURE OF THE BOND.
- 4) DO NOT ADJUST, MOVE, SHIFT OR OTHERWISE DISTURB THE SUMP, FITTINGS OR PIPING DURING THE CURING PROCESS.
- 5) **▲ CRITICAL** YOU MUST ENSURE A FULL CURE BEFORE WATER TESTING. FOLLOW YOUR ADHESIVE INSTRUCTIONS FOR TEMPERATURE GUIDELINES.

B) Gluing your Fitting to Conduit

B.1) Your conduit and Bravo FF-Series Flange Fittings should be clean and **COMPLETELY DRY AT ALL TIMES**. All pre-abraded areas should be inspected for debris and inconsistencies. No dirt or other foreign material should be on or inside the fiberglass fitting components. **SEE A.1**

B.2) Proceed to dry-fit, layout, measure, cut, bend, thread, etc... your conduit. Ensure that the FF-Series Conduit fitting can slide over the conduit and it's bends after your work OR, make your bends with the flange held in it's approximate position by one or two of it's set screws.

▲ CRITICAL

DO NOT BEND THE CONDUIT WITH THE FITTING ITSELF. KEEP THE START AND END OF THREADS OR BENDS 2" INCHES AWAY FROM THE FACE OF THE FLANGE. MAINTAIN A 2 INCH MINIMUM DISTANCE TO THE FLANGE FACE FOR ANY COUPLERS OR SEAL-OFFS.

B.4) Dry-fit the the pipe with both halves of the flange fitting against the sump wall. **BOTH HALVES OF THE FITTING MUST BE PRESENT ON THE CONDUIT AND MUST SIT FLAT AGAINST THE WALL.** If the conduit angle is interfering with this then adjust the conduit so both fitting halves sit flat and square against the sump wall.

B.5) USE BRAVO-APPROVED ADHESIVES ONLY (PAGE 3). FOLLOW THE ADHESIVE MANUFACTURERS INSTRUCTIONS. FOLLOW THE INSTRUCTIONS DETAILED BELOW TO MIX AND APPLY YOUR ADHESIVE.

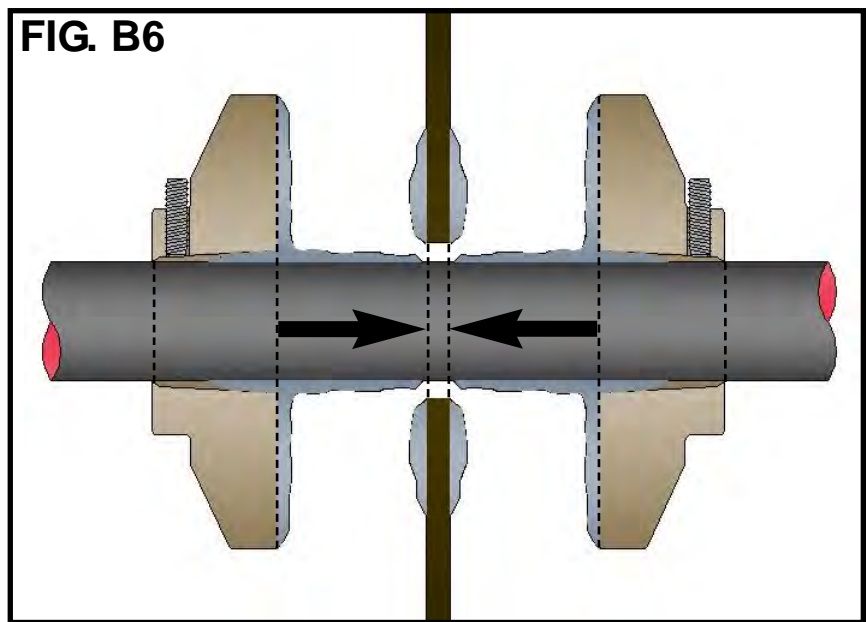
FOR BRAVO ADHESIVE, IT IS PRE-THICKENED. DO NOT ADD FILLER. FOLLOW DIRECTIONS ON THE JAR. SKIP TO B6.

Each fitting is supplied with two bags of milled fiberglass filler. Follow the list to add the right amount of filler to a Smith or Ameron adhesive kit and thoroughly mixed **BEFORE ADDING CATALYST**.

Cool weather - 1 bag of filler per kit
HOT weather - 2 bags of filler per kit

When thoroughly incorporated, add catalyst and thoroughly mix again before application.

B.6) When all hole saw cuts have been made and piping has been tested with a **pass** result, apply a **GENEROUS** amount of adhesive to all contact surfaces: the wall, the fitting, inside the fitting cavity (**PACK IT**) and to the pipe leading up to the wall for approximately 2 inches. (**Fig. B6**).



B.7) With the filler-mixed adhesive generously coating all contact surfaces, Push the two fitting halves together (**Fig. B6 and B7**) all the way to the wall. As shown in the default orientation **Fig. B8**, align your set-screws so that one is at **12-o-clock** and the other at **3-o-clock**.

B.8) Use an adhesive brush or gloved finger to bead the adhesive and keep it from sagging or running off the fitting. Spread it around as thick as possible 360° around the two Critical Joints (**FIG. B7**). Repeat or add additional mixed adhesive to build up a thick, heavy bead at each critical joint.

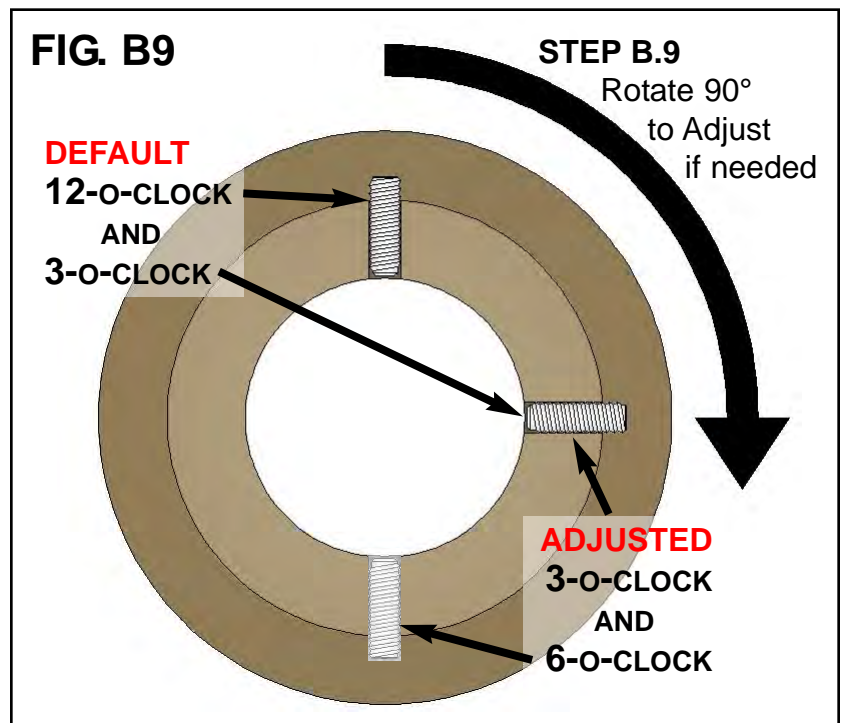
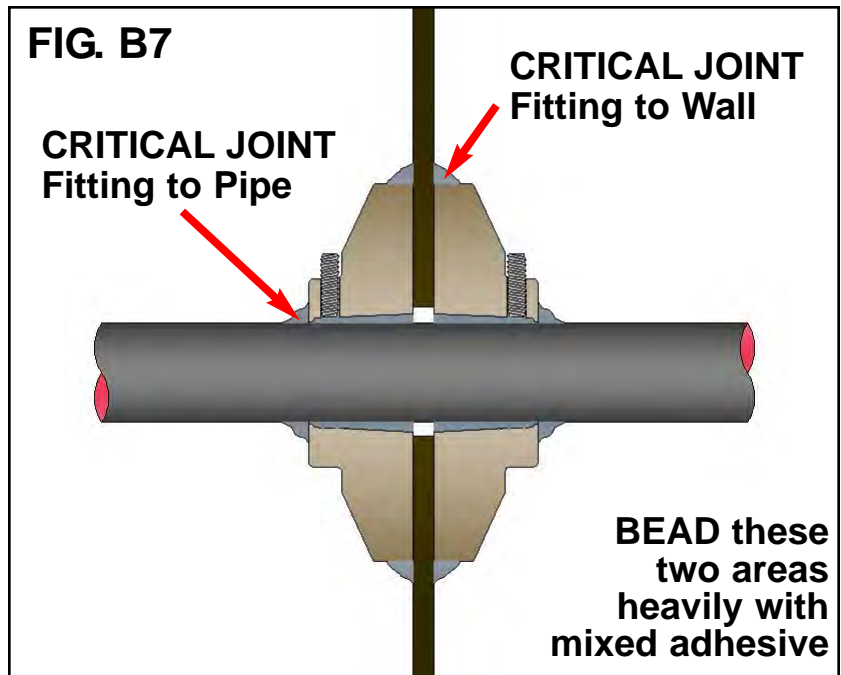
▲ CRITICAL

B.9) LOCKING FITTINGS:

Using a Bravo-supplied Allen wrench (1 per fitting) hold the fitting firmly to the wall with your hand with the two set screws in the **DEFAULT** orientation and tighten each set-screw **BY HAND** until snug (**Fig. B9**).

CLAMPS REQUIRED FOR ROUND SUMP FITTINGS

Pay special attention to the Critical Joint between the Flange and the Sump Wall (**Shown in FIG. B7**) when you tighten either set-screw. If a Flange moves away from the wall while you are tightening the set-screws, back off both set-screws, rotate the Flange 90° degrees Clockwise (to the right) so the set-screws point to 3-o-clock and 6-o-clock (**ADJUSTED orientation Fig. B.9**) and tighten the set screws again until your flanges are flat. Re-apply the adhesive bead at both Critical Joints (**FIG. B7**).



DO NOT TIGHTEN THE SET-SCREWS ALL THE WAY OR WITH EXCESSIVE FORCE.

NEXT PAGE FOR SET-SCREW ALTERNATIVE

SET-SCREW ALTERNATIVE

B.10) BRAVO CLAMPS:

OPTIONAL: Apply the Bravo Clamps immediately following adhesive application to each side of the pipe.

To Install: Tighten the clamp to the pipe approximately 1" from the face of the Flange and hand-tighten each thumb screw so each bolt is evenly snug against the fitting. Install one on each side.

When both clamps are snug then proceed to apply a 1/4 - 1/2 turn to each bolt evenly. When the bolts are applying enough force against the Flange, the clamp will slide along the pipe away from the Flange. Evenly turn the bolts until this occurs to maintain an even amount of force against the face of the Flange.

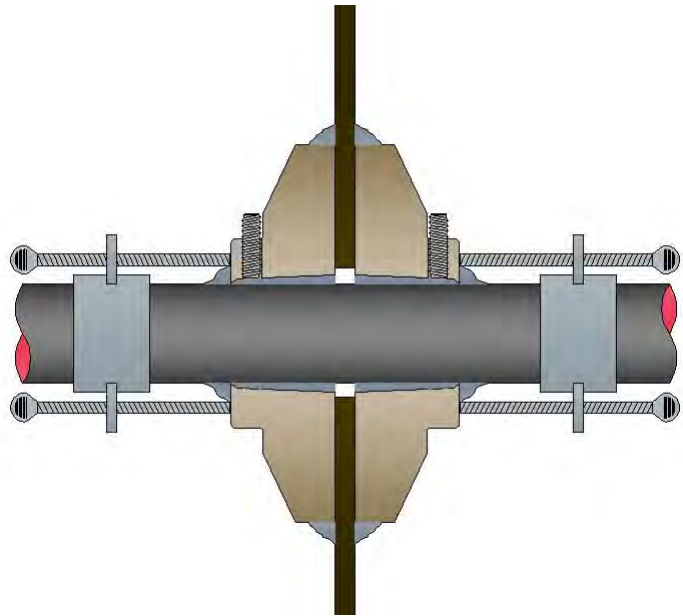
After clamps have been installed and secured, use an adhesive brush or gloved finger to bead the adhesive and keep it from sagging or running off the fitting. Spread it around as thick as possible 360° around the two Critical Joints (**FIG. B7**). Repeat or add additional mixed adhesive to build up a thick, heavy bead at each critical joint.

CLAMP KIT CHART

MODEL

F-07-FF Fitting ————— T-FF-CLAMP-1

F-10-FF Fitting ————— T-FF-CLAMP-1



DO NOT TIGHTEN THE THUMB-SCREWS ALL THE WAY OR WITH EXCESSIVE FORCE.

B.11) Glue all penetration fittings and allow the full cure time per the adhesive kit instructions.

B.12) After adhesive has fully cured, remove the clamps by backing off the thumbscrews until they disengage from any adhesive that covered them.

OPTIONAL: Re-apply adhesive to fill the holes the clamp-bolts left in the adhesive at the face.

C) TESTING YOUR F-SERIES INSTALLATION

After all the FF-Series Fiberglass Flange Fittings are installed with your conduit and have fully cured: Water level test to a minimum of 2" above the highest entry fitting or joint. Ensure there are no other components that may be damaged by the water test. Follow all local codes and regulations.